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FISH AND WILDLIFE SERVICE Mountain-Prairie Region



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MAR 05 2008

Memorandum

To: Project Leader, Des Lacs National Wildlife Refuge
From: Chief, Division of Water Resources
Subject: 2007-2008 Annual Water Use Report/Management Plan

The subject report has been reviewed and approved as submitted.

The 2008 Operation Plan for Des Lacs NWR will be forwarded to the North Dakota State Engineer's Office as necessary. Attached is the signed approval page for your files. Thank you for the timely submittal of the report.

Attachment

DES LACS NATIONAL WILDLIFE REFUGE

WATER MANAGEMENT PLAN

2008

Prepared by: Dan Seveeson Date: January 14, 2008
Refuge Manager

Concurrence: Gary Erickson Date: 01/25/08
Project Leader

Regional Approval: A. Paul Combs Date: 2/3/08
Refuge Supervisor

Regional Approval: Richard A. Coleman Date: 2/11/08
Regional Chief of Refuges

Regional Approval: Gary Marshall Date: 2-12-08

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2007 WATER MANAGEMENT

Precipitation for the October 2006-March 2007 winter period was 4.96", above the normal fall-winter precipitation of 3.93". Total snowfall for the same period was 39.90". Fortunately February and March brought above normal precipitation in the form of snow, because the October through January period was dryer than normal and was coupled with dry topsoil conditions and a poor frost seal. The ground did not freeze until late November.

We received well below average precipitation in January, with only 0.19" of moisture and 2.40" of snow. Temperatures were normal and there was only a light snow cover with hilltops barren at the end of the month. February brought above average precipitation at the end of the month, with 1.11" of moisture and 8.75" of snow. March also brought above average precipitation, with 1.74" of moisture and 7.00" of snow received on five days during the month. Almost 1 inch of moisture arrived as rain. A record high for the date was observed on March 12 with 62°F. All snow was gone by the end of the month. Runoff started slowly on March 11 but quickly filled up the small coulee Units 3 and 4a. Runoff continued for the next week, slowly filling the Middle Des Lacs Lake Unit 4 and 5 and starting to fill Unit 6, all of which were much lower than normal from the dry fall of 2006. By the end of March, Unit 4 had increased 2', Unit 5 was full and Unit 6 almost filled. Unit 7, the Lower Des Lacs Lake rose just over 0.5'. The Upper Des Lacs Lake, Units 1 and 2 rose only slightly. Water levels in the surrounding drift prairie were very low and were expected to disappear quickly once the frost went out. After receiving above normal precipitation in March, April turned dry with only 0.68" of moisture and 3.0" of snow on six days during the month. Temperatures were mild with wide variations in temperatures throughout the month. The high was 80°F on April 28, and the low was 6°F on April 6. Runoff was complete in April and only two small coulee units (3 and 4a) and Unit 5 filled to capacity. All other units remained well below normal and the surrounding area wetlands disappeared quickly by the end of April. No water was released downstream of the refuge.

After much talk and worry about a drought in 2007, it officially ended in May. The month started dry but frequent rains changed the outlook and by the end of the month we had received 5.98" of moisture on 14 days, with 2.43" of rainfall on May 30. No snow was recorded. Temperatures were warm with wide variations throughout the month. The high was 86°F on May 9, and the low was 30°F on May 15. Water levels were very low for spring in early May, but rose slightly after the rainfall. Most of the early rain events soaked into the ground and no runoff occurred. Late in the month many of the units quit receding and began to rise slowly. No water had left the refuge at the end of May, and water in the lower Unit 7 finally just reached the bottom of the outlet structure. Rain continued unabated in June. Rain was frequent all month and by the end of the month we had received 3.47" of moisture on 13 days. Temperatures were warm throughout the month with a high of 92°F on June 9, and a low of 42°F on June 4-5. Wetlands increased slightly during the month and remained at good levels for submergent growth. Very good sago pondweed growth was observed in Units 2, 3, 4, 6, 7 and 8. Unit 7 remained right at the bottom of the water control structure.

We received rain on four days in the first half of July. It then became hot and dry with no rain. July rainfall totaled only 1.25", over 1" below normal. Temperatures were warm throughout the month and abnormally hot the last week with a high of 103°F on July 24. Evaporation began quickly lowering marsh levels. We began pulling boards out of the Unit 3 structure on July 9 to slowly dewater the unit for the water control structure rehab project scheduled to begin in mid-August. One board was pulled on July 9, and two more on July 20. One board was pulled in Unit 6 to help lower all Units 4, 5 and 6 slightly for summer, and reduce the water level in Unit 4, downstream of Unit 3 structure, for construction. By the end of July, Unit 3 marsh was dry. All other wetlands remained at optimum levels with Unit 7 remaining low and in drawdown for management.

August and September continued to be hot and dry. Three days of precipitation early in August brought only 0.51" of moisture followed by only 0.67" of moisture in September. This total for late summer was over 2" below normal. Wetland levels declined throughout August and September with the hot dry weather. The Upper and Middle Des Lacs Lakes, Units 1, 2, 4, 5 and 6 all declined 1.0' over the two months, with mudflats showing on the edges of all the units. Unit 8 declined 1.9' and much of the unit showed mudflats. Unit 3 remained dry for construction of the weir. There was good growth of emergent vegetation on the mudflats in Unit 7. Small wetlands in the surrounding area also all dried up. The first frost was 26° F on September 13.

October remained very dry and no snow was received. Although we received rain on six days in the month, moisture totaled only 0.85". Wetland water levels continued to decline slightly in October and all wetlands froze over briefly on October 27, but later reopened. The shallow water in all the units exposed mudflats and shorelines and made good feeding and loafing sites for shorebirds, and excellent conditions for waterfowl feeding on sago pondweed. November remained very dry but much cooler and more normal. We only received moisture in the form of snow (2.0") on one day in the month, totaling 0.02". Refuge wetlands froze over on November 21. The ground also froze but there was little topsoil moisture for a frost seal in the area. Early prospects for good runoff in the spring are poor. December remained relatively dry with 3.60" of snow and only 0.31" of moisture recorded on six days. The high temperature was 38° F with seven days of above freezing temperatures during the month. At the end of the year there was minimal snow cover.

The drawdown in Unit 7 was successful as planned. Unit 7 is drawndown to 323 surface acres from full pool of 424 acres. Units 3, and 4a were dry at the end of the year.

Cattails and hardstem bulrush in the Unit 8 bypass channel were sprayed with glyphosate in August. Cattail and bulrush growth is primarily in the north and south ends of the channel.



Figure 1. Unit 8 bypass ditch with bulrush blocking flow just south of Unit 7 water control structure. This was later treated with glyphosate and will be cleaned out in 2008. 7/07 DJS.



Figure 2. Ducklings feeding on a sago pondweed bed in Unit 4a. 7/07 DJS.



Figure 3. Mudflats on the south end of Unit 2. 9/07 DJS.



Figure 4. Emergents growing on the north end of Unit 7. 7/07 DJS.

TABLE 1. Climatic Conditions on Des Lacs NWR October 2006-December 2007 measured at Kenmare, ND

MONTH	TEMPERATURES (°F)		PRECIPITATION (inches)		
	HIGH	LOW	SNOW	MOISTURE	AVERAGE MOISTURE
OCTOBER 2006	76	12	9.25	0.87	0.94
NOVEMBER	63	-13	5.50	0.55	0.58
DECEMBER 2006	39	-18	7.00	0.50	0.52
JANUARY 2007	41	-23	2.40	0.19	0.64
FEBRUARY	41	-25	8.75	1.11	0.53
MARCH	73	1	7.00	1.74	0.72
APRIL	80	6	3.00	0.68	1.20
MAY	86	30	0.00	5.86	2.07
JUNE	.2	42		3.47	3.18
JULY	103	48		1.25	2.33
AUGUST	94	38		0.51	1.86
SEPTEMBER	91	26		0.67	1.62
OCTOBER	76	24	0.00	0.85	0.94
NOVEMBER	60	-11	2.00	0.02	0.58
DECEMBER 2007	38	-15	3.60	0.31	0.52
TOTAL 2007			26.75	16.66	16.03

The NOAA Climate Reference Network weather station was operational all of 2007. The station is located 20 miles north of Kenmare on the west side of the lake in Unit HB-4.

Work began on the Unit 3 water control structure project in early August. JoAnne Construction, Minot was the contractor and they started by building coffer dams and completing final de-watering of the construction site. Doug Wylie, engineered the project and Duane Dockter was the construction inspector. Most of the work was done in September and October. Sheet pile wing walls were installed to prevent water from going around the weir and the stop log bay was cut down 1' to allow for better drawdown capability. The old rock and fill was dug out on each side of the structure and replaced with clean clay fill and rip-rap. The bridge walls and pilings were cleaned out and concrete poured into the base to stabilize the bridge abutments. Ward County paid for the additional work on the bridge abutments. All of the rip-rap behind the sheet pile weir and in the spillover area was grouted with concrete to hold it in place. The final inspection was completed in late October and stop log boards installed.



Figure 5. Unit 3 WCS prior to rehabilitation. Note void under bridge abutment caused by water flowing around weir and exiting under bridge. 10/06 DJS.



Figure 6. Installing sheet pile with vibrating driver to old weir to prevent water from going around the weir and under the bridge abutment. 9/07 DJS.



Figure 7. Concrete poured to seal off bridge abutments and rip-rap placed in the spillway area. Rip-rap was later grouted in place. 10/07 DJS.



Figure 8. Completed structure with grouted rip-rap, catwalk installed, cap on sheet pile weir. 10/07 DD.

WATER MANAGEMENT PLAN FOR 2008

Prospects for significant runoff in the Spring of 2008 are poor as of January if normal snowfall is received in February and March. Topsoils were dry in late fall 2007, and the area has a poor frost seal. Total snowfall from October to December was 5.60" with 1.18" of moisture, and there is little snow cover. All units may not fill to desired levels, and if dry conditions prevail in late winter, conditions will be good to lower water levels in the Upper and Middle Lakes in 2008, which is needed to improve habitat conditions. The main lakes, Units 1, 2, and 4 have not been drawndown significantly since early 1993 during the last drought and need to be lowered to germinate emergent vegetation and oxidize soils to improve productivity.

The Unit 2 water control structure will be boarded up enough to keep water in Unit 4 from rising and flowing north into Units 2 and 1. All other units south will be held at normal full spring levels except Unit 7, which will again be attempted to keep at a lower than full level. After Units 4, 5 and 6 levels decline, water will be released from Units 1 and 2 to flow south if levels are high enough.

The Unit 3 water control structure is boarded up and will be expected to fill and spill even with poor runoff because of the small size of the unit and large runoff area.

Water level objectives for 2008 are generally lower than levels specified in the Long Range Water Management Plan which was approved in 1990. All water levels are given in feet above Mean Sea Level (MSL). Units 1 and 2 are currently near desired water elevations. All units are expected to rise only slightly during spring runoff and elevations will be determined by how much late winter precipitation in the form of snow is received. It currently is too early to make predictions other than to note that a poor frost seal is present along with only minimal snow cover.

Plans for replacing the Unit 6 water control structure are being made. We again plan on a late summer construction period, with drawdown in July for August through October construction. Coffor dams are not expected to be built.

The Unit 8 Bypass Ditch needs to be cleaned of accumulated silt and some cattails that are beginning to encroach. This work will be done force account with a rented excavator in August. Plans are to also use the excavator to clean silt from the Unit 4, 5, 7 and 8 control structures

We will continue treating cattails in spillways and ditches with glyphosate to prevent siltation in those areas and keep them open for high water flows.

We have continued an active dialogue with the Ward County Water Resources Board in developing a plan to put in a Bypass Channel and associated water control structures that would bypass water around Units 4, 5 and 6 and allow lower water levels to be maintained in Units 1, 2 and 4 as desired under the Long Range Water Management Plan. The Board so far has been willing to commit money to the project if we could potentially store additional water in the spring to alleviate downstream flooding where the Des Lacs River dumps into the Souris River near Burlington. We anticipate to work on this project planning which will include compatibility, environmental assessment, public involvement and 404 permitting. The Board

will have to come up with the funding to make the project happen if it gets through all the planning and regulatory processes. The Unit 6 water control structure invert will be set at elevation identified in the bypass channel plans

Unit 1

The objective levels after spring runoff will be 1782.0. Unit 1 water level froze at 1780.7 in December 2007, over 1.5' lower than the 1782.3 average for December from 1998-2006 freeze-up levels. Water levels are expected to rise to a maximum of 1782.0 during spring runoff with normal conditions. Lower water levels are desired to encourage emergent vegetation growth on the perimeter of the lake. The water control structure is set to allow excess water to be released into Unit 2 and farther south. The water levels in Unit 1 and Unit 2 will be managed at the same levels and be controlled by the Unit 2 water control structure.

Unit 2

The Des Lacs Long Range Water Management Plan calls for an objective level of 1782.5. The Plan also states that "If this objective is met and exceeded by spring runoff, excess water will be released into Units 4 and 5 and farther downstream in an attempt to meet the objective levels of those pools, and to keep Unit 2 low enough to allow the emergents that have become established to continue to grow". Unit 2 water level froze at 1780.7 in December 2007, 1.3' lower than the 1782.0 average for December from 1998-2006 freeze-up levels. The water and ground levels in Unit 4 continue to restrict flow downstream out of Unit 2. Unit 4 froze at 1782.8 in December 2007. This level is higher than the spring objective level for Unit 2, which we expect to rise after spring runoff to about 1782.0. Unit 4 is likely to rise to the 1783.5 or higher level in the spring of 2008 since we are now able to restrict flow from Unit 4 flowing north into Unit 2, and that has helped to keep Unit 2 water levels lower. Emergents are expected to increase in the south end of Unit 2 and along the edges due to the low water levels and this is encouraged and good for waterbirds. The higher water level in Unit 4 will prevent any releases out of Unit 2 to the south and all water levels will be determined by runoff and evaporation rates.

Unit 3

The objective level after spring runoff will be the spillway level of 1787.0. Current level at December 2007 freeze-up was dry. The Unit 3 water control structure will remain closed all year. This unit is expected to easily fill to spillway levels in the spring. Cattail stands appeared to remain stable in 2007 and some mowing of openings in the dense stands was completed in the fall. The drawdowns in 2006 and 2007 should keep productivity of submergent plants high and has not caused an increase in cattail coverage. High spring runoff levels may be keeping the vegetation in check with good nesting conditions available in spring.

Unit 4

The objective level after spring runoff will again be 1784.0. The Unit 4 water control structure boards will be kept open to help with releasing water downstream as necessary. The water level at freeze-up in December 2007 was 1782.8, and the unit showed mudflats around the entire perimeter and received excellent fall waterfowl use. This is over 1.5' higher than December 2006 freeze-up levels. Water will be released into Unit 5 immediately in the spring in an attempt to pass water and fill Unit 6. Water levels are not expected to rise above spring objective levels of 1784.0 if they get that high due to poor runoff potential as of January. Levels are expected to stay well below the emergency spillway level. Fall objective level is 1781.5 and will help to reestablish emergents. Based on a survey completed for the Ward County Water Resources Board in 2003, the high point that controls the lowest level that Unit 4 can be drawn down is about 500' south of the structure and is at elevation 1783.75'.

Unit 4A

The objective level after spring runoff will be normal at 1788.4. Generally the unit is filled to the spillway level which is 1788.4. Fall freeze-up in December 2007 had the unit almost dry. All boards are out of the water control structure and will remain out to pass runoff flows, and then boarded up to capture enough flow to fill the unit to spillway elevation. The structure was cleaned out in late 2005 and will pass adequate water. Peak water level is expected to reach 1789.0 during spring runoff. Water levels will be kept at 1787.0 if possible into the fall.

Unit 4B

No water was pumped in 2007. Low water levels in the spring did not produce any habitat in the unit. No pumping is planned in 2008, and the unit is expected to be mostly dry with water only in some of the ditches. Marginal habitat will be provided.

Unit 5

The objective level after spring runoff is 1783.5. It is expected that the Unit 5 water control structure boards and gate will remain open all spring to pass water from upstream units. The December 2007 freeze-up level was 1782.9. Additional water above 1783.5 will be released into Unit 6. Fall objective level is again 1780.5 or lower. This level may cause potential vegetation problems as it creates mud flats and increased cattail germination, and the only water left in the unit is in the channel. The water level must be lowered to that level to allow water to drain out of Unit 4.

Unit 6

The objective level after spring runoff is 1783.4, which is the emergency spillway full pool level. The water level at freeze-up in December 2007 was 1782.8. This unit is expected to fill to near objective level in spring 2008 and additional water will be passed through the structure or the emergency spillway. The unit will be de-watered in July for construction of a replacement water control structure in the late summer. This may cause increased germination of cattails. Cattails have been kept at acceptable levels with high water levels, and careful consideration of not lowering water levels too early when temperatures are still high. Additional mowing or disking of cattails may occur in the fall if extensive germination is noted in order to keep the cattails from dominating the shallow water unit.

Unit 7

Target level for the unit is 1780.0 after spring runoff. Fall freeze-up level was 1778.9, well below the fall target level of 1780.0 as runoff in 2007 was limited and high temperatures and low precipitation allowed the unit to be lowered primarily by evaporation. Spring 2008 runoff is expected to cause a rise to a maximum of 1780.0. The bypass ditch is not expected to run. Fall 2008 target level is lower at 1778.0. The de-watering of Unit 6 in July may provide water for growth of emergents that are trying to establish on the margins and north end of the unit. No botulism has occurred in the unit in 2006 or 2007, even with low water levels and high temperatures.

Unit 8

The objective level after spring runoff will be the spillway level which is 1783.9. Fall 2007 freeze-up level was 1781.4, the same as December 2006. Target level is expected to be reached because it is a small unit and spillway is expected to run with elevations of 1784.1 reached for a short time during spring runoff, although that level was not reached in 2007. Water levels below 1783.9 will be determined by evapotranspiration until late fall when levels will be lowered to approximately 1782.0 if necessary.

DES LACS NWR IMPOUNDMENT DATA

UNIT 1

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1783.0</u> LOW: <u>1780.5</u>
JANUARY 31	FROZEN AT 1780.90	
FEBRUARY 28	FROZEN AT 1780.90	
MARCH 16	1781.9	
APRIL 24	1781.8	1782.0
MAY 7	1781.62	
JUNE 4	1781.9	1781.5
JULY 13	1781.7	
AUGUST 31	1780.8	
SEPTEMBER 19	1780.7	
OCTOBER 27	1780.52	1780.0
NOVEMBER 25	FROZEN AT 1780.7	
DECEMBER 31	FROZEN AT 1780.7	
HIGH (AFTER SPRING RUNOFF): <u>1781.9</u>		HIGH FOR YEAR: <u>1781.9</u>
LOW: <u>1780.7</u>		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1785.6*</u>		
BOTTOM OF OUTLET: <u>1779.5*</u>		
Acre-feet stored as of December 31 <u>14458 AF</u>		
Maximum Acre-feet stored at spillway elevation 1785.6 <u>27163 AF</u>		
*1999 survey results-changed from previous records		

DES LACS NWR IMPOUNDMENT DATA

UNIT 2

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1782.5</u> LOW: <u>1780.0</u>
JANUARY 31	FROZEN AT 1780.90	
FEBRUARY 28	FROZEN AT 1780.90	
MARCH 26	1781.50	
APRIL 24	1781.70	1782.0
MAY 16	1781.60	
JUNE 4	1781.80	1781.5
JULY 13	1781.60	
AUGUST 31	1780.70	
SEPTEMBER 19	1780.60	
OCTOBER 13	1780.60	1780.0
NOVEMBER 25	FROZEN AT 1780.6	
DECEMBER 31	FROZEN AT 1780.6	
HIGH (AFTER SPRING RUNOFF): <u>1781.7</u> HIGH FOR YEAR: <u>1781.8</u>		
LOW: <u>1780.6</u>		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1789.4*</u>		
BOTTOM OF OUTLET: <u>1778.33*</u>		
Acre-feet stored as of December 31 <u>7003 AF</u>		
Maximum Acre-feet stored at spillway elevation 1786.2 <u>16614 AF</u>		
*2000 New water control structure-change from previous records		

DES LACS NWR IMPOUNDMENT DATA

UNIT 3

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1787.0</u> LOW: <u>1784.0</u>
JANUARY 31	Dry	
FEBRUARY 28	Dry	
MARCH 13	1787.7 Spilling	
APRIL 16	1786.7	1787.0
MAY 16	1786.7	1787.0
JUNE 4	1787.7 Spilling	
JULY 31	Dry	1786.0
AUGUST 31	Dry	
SEPTEMBER 28	Dry	
OCTOBER 31	Dry	
NOVEMBER 30	Dry	
DECEMBER 31	Dry	
HIGH (AFTER SPRING RUNOFF): <u>1787.7</u> HIGH FOR YEAR: <u>1787.7</u>		
LOW: <u>1784.0</u> Dry		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1787.0</u>		
BOTTOM OF OUTLET: <u>1782.0*</u>		
Acre-feet stored as of December 31 <u>00</u> AF		
Maximum Acre-feet stored at spillway elevation 1786.96* <u>99</u> AF		
*1999 survey results-changed from previous records		
? Estimate-Area capacity table doesn't go below 1788.0'		

DES LACS NWR IMPOUNDMENT DATA

UNIT 4

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1783.5</u> LOW: <u>1780.5</u>
JANUARY 31	FROZEN AT 1781.28	
FEBRUARY 28	FROZEN AT 1781.28	
MARCH 13	1783.70	
APRIL 6	1783.34	1784.0
MAY 12	1783.26	
JUNE 18	1784.30	1784.0
JULY 13	1784.00	
AUGUST 9	1783.40	
SEPTEMBER 19	1783.0	1782.0
OCTOBER 10	1782.80	
NOVEMBER 25	1782.80	
DECEMBER 31	FROZEN AT 1782.80	
HIGH (AFTER SPRING RUNOFF): <u>1783.7</u> HIGH FOR YEAR: <u>1784.3</u> LOW: <u>1781.28</u>		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1788.5*</u> BOTTOM OF OUTLET: <u>1780.4*</u>		
Acre-feet stored as of December 31 <u>1162 AF</u> Maximum Acre-feet stored at spillway elevation 1788.5 <u>5649 AF</u> *1999 survey results-changed from previous records		

DES LACS NWR IMPOUNDMENT DATA

UNIT 4A

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008	
PLANNED:		HIGH: <u>1788.4</u>	LOW: <u>1785.0</u>
JANUARY 31	Dry		
FEBRUARY 28	Dry		
MARCH 13	1789.34 Spilling		
APRIL 6	1788.06		1788.4
MAY 12	1787.90		
JUNE 21	1788.52		
JULY 13	1788.40		
AUGUST 9	1788.36		
SEPTEMBER 19	1786.90		
OCTOBER 10	1786.24		1787.0
NOVEMBER 25	1786.20 Frozen		
DECEMBER 31	1786.20 Frozen		
HIGH (AFTER SPRING RUNOFF): <u>1789.34</u> HIGH FOR YEAR <u>1789.34</u>			
LOW: <u>Dry</u>			
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1788.4*</u>			
BOTTOM OF OUTLET: <u>1786.6*</u>			
Acre-feet stored as of December 31 <u>00?</u> AF			
Maximum Acre-feet stored at spillway elevation 1788.4* <u>47</u> AF			
*1999 survey results-changed from previous records			
? Estimate-Area capacity table doesn't go below 1788.0'			
**Estimate-gauge does not go that low, removed during work on dike.			

DES LACS NWR IMPOUNDMENT DATA

UNIT 5

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008	
PLANNED:		HIGH: <u>1783.5</u>	LOW: <u>1780.5</u>
JANUARY 31	Dry		
FEBRUARY 28	Dry		
MARCH 13	1784.40		
APRIL 16	1783.40		1783.5
MAY 8	1783.40		1783.5
JUNE 26	1784.40		
JULY 13	1784.20		
AUGUST 9	1783.56		
SEPTEMBER 19	1783.20		1781.5
OCTOBER 10	1782.90		1780.5
NOVEMBER 25	1782.90 Frozen		
DECEMBER 31	1782.90 Frozen		
HIGH (AFTER SPRING RUNOFF): <u>1784.40</u> HIGH FOR YEAR <u>1784.40</u>			
LOW: <u>Dry</u>			
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1784.6*</u>			
BOTTOM OF OUTLET: <u>1779.2*</u>			
Acre-feet stored as of December 31 <u>21 AF</u>			
Maximum Acre-feet stored at spillway elevation 1784.6* <u>90 AF</u>			
*1999 survey results-changed from previous records			

DES LACS NWR IMPOUNDMENT DATA

UNIT 7

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1782.0</u> LOW: <u>1780.0</u>
JANUARY 31	FROZEN AT 1777.4	
FEBRUARY 28	FROZEN AT 1777.4	
MARCH 13	1779.0	
APRIL 24	1779.88	1780.0
MAY 8	1778.98	
JUNE 26	1779.0	
JULY 9	1779.0	1779.0
AUGUST 31	1778.94	
SEPTEMBER 19	1778.90	1778.5
OCTOBER 10	1778.90	1778.0
NOVEMBER 25	FROZEN at 1778.90	
DECEMBER 31	FROZEN AT 1778.90	
HIGH (AFTER SPRING RUNOFF): <u>1779.88</u> HIGH FOR YEAR <u>1779.88</u>		
LOW: <u>1777.4</u>		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1783.9*</u>		
BOTTOM OF OUTLET: <u>1778.5</u>		
Acre-feet stored as of December 31 <u>576 AF</u>		
Maximum Acre-feet stored at spillway elevation 1783.9* <u>2556 AF</u>		
*1999 survey results-changed from previous records		

DES LACS NWR IMPOUNDMENT DATA

UNIT 8

PROGRAM YEAR 2008

WATER SURFACE ELEVATION FOR 2007		PLANNED WATER SURFACE ELEVATION FOR 2008
PLANNED:		HIGH: <u>1784.0</u> LOW: <u>1782.0</u>
JANUARY 31	FROZEN AT 1781.4	
FEBRUARY 28	FROZEN AT 1781.4	
MARCH 21	1782.56	
APRIL 24	1782.6	1784.0
MAY 8	1782.46	
JUNE 4	1783.16	
JULY 9	1783.4	
AUGUST 9	1782.4	
SEPTEMBER 19	1781.5	1782.0
OCTOBER 10	1781.4	
NOVEMBER 25	FROZEN AT 1781.4	
DECEMBER 31	FROZEN AT 1781.4	
HIGH (AFTER SPRING RUNOFF): <u>1782.6</u> HIGH FOR YEAR <u>1783.4</u>		
LOW: <u>1781.4</u>		
MAXIMUM ELEVATION PERMISSIBLE (CREST OF SPILLWAY): <u>1783.9*</u>		
BOTTOM OF OUTLET: <u>1780.0*</u>		
Acre-feet stored as of December 31 <u>7 AF</u>		
Maximum Acre-feet stored at spillway elevation 1783.9* <u>127 AF</u>		
*1999 survey results-changed from previous records		



UNITED STATES GOVERNMENT

MEMORANDUM

Date: February 5, 2008

From: Souris River Basin NWR Complex
Des Lacs NWR
P.O. Box 578
Kenmare, ND 58746

To: ND/SD/NE/KS Refuge Supervisor, Denver, CO

Subject: Annual Water Use Report/Management Plan

Attached is the subject report for review and forwarding to Water Resources (MS 60189) for the Des Lacs NWR. If you have any questions please call me at 701-385-4046 x224.

A handwritten signature in cursive script that reads "Dan Severson".

Dan Severson
Refuge Manager
Des Lacs NWR